

The Multidisciplinary Cultural Heritage Community: Towards a Definition of Roles

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ABSTRACT: As the interest in, and value of, cultural heritage data has increased exponentially over the past decade, there has been a heightened desire to address the "multidisciplinary user" cultural heritage community's needs. While this should be continued and encouraged, the purpose of digitisation - the why we digitise cultural heritage, for whom, and at which level of quality - is increasingly being lost amongst ambiguous terms such as stakeholders, users, and data reuse(rs). These terms have evolved organically over time, borrowing from established business models, often aligning with circular economy concepts. This is challenging, as such economic models are strongly connected with physical manufacturing processes with tangible outputs (through Digital Twins), while cultural heritage digitisation is seen as part of the 'knowledge economy' as an enabler of innovation within the circular economy model as Memory Twins.

In this paper, we present a clarification of the terms and roles of those multidisciplinary actors who use information and data within digital documentation of cultural heritage to minimise the risk of misunderstanding and the potential to unnecessarily address needs outside the scope of the digitisation effort's aims and objectives. Further, through understanding these roles within the context of the circular economy, we consider how reframing cultural heritage information and data as a highly valuable raw material rather than a product or service can produce higher quality results, impact, and sustainability.

1. INTRODUCTION

Defining why, what, when, where, and whom we digitise cultural heritage for is fundamental to the success of the digitisation process. If we lack clarity on why we are digitising, a project runs a very high risk of becoming unfocused and unclear about what the outputs will be; if we do not know when, where and what we are digitising, a project is in danger of over/under-estimating the allocation of resources invested into the digitisation effort; if we do not understand for whom we are digitising, we cannot provide a product or service that is meaningful and impactful.

Within the context of small-scale projects, it is arguably easier to establish such boundaries; there is a need or interest that motivates the digitisation of a cultural heritage resource with a

defined use case and known outputs to satisfy the identified needs. This can be seen as similar to the take-make-consume model of the Linear Economy; however, a more circular approach to digitisation and the creation of cultural heritage assets has become increasingly advocated. This shift incorporates the language and principles of the Circular Economy, highlighting the potential and benefits of enriching digital objects (in the broadest sense - not just artefacts, but buildings, monuments, sites and cultural landscapes), with supplementary cultural heritage data (both tangible and intangible), transforming single digital records into comprehensive and contextualised, multivocal, documents which reflect a deeper meaning, significance, or memory of cultural heritage.

The holistic approach to the digital documentation of cultural heritage, while clearly increasing the value and return on investment of the initial digitisation effort, inherently increases and complicates the demarcation of boundaries of the ‘why, what, when, where, and for whom’ we are digitising. This dichotomy is discussed in the EU VIGIE 2020/654 Study on Quality in 3D Digitisation of Tangible Cultural Heritage **Fehler! Verweisquelle konnte nicht gefunden werden.**, which seeks to approach a holistic documentation by reducing Complexity through risk management and recording of paradata – the processes by which a digital record is created **Fehler! Verweisquelle konnte nicht gefunden werden.** – to understand the context of a cultural heritage resource from a multidisciplinary viewpoint.

2. TOWARDS AN UNDERSTANDING

While the recommendations of the EU VIGIE 2020/654 Study address the specific issues of digital documentation, there is still a disconnect with fundamental terminology and meanings, with each discipline bringing its own understanding, interpretation, and priorities of terms to a digitisation effort.

With more potential actors involved and diversity of outputs envisioned, the need for clarity regarding who those actors are and what roles they play is of pressing concern. This can be considered a function of project management – and to an extent it is – however, while there are guidelines and good practice documents for specific management of multi-disciplinary digitisation project tasks, the literature for an overarching approach to such projects is weak.

While great efforts have been made within sections of the digitisation workflow to harmonise terms, this apparent lack of approach to management is curious, with definitions being interpreted on a project-by-project or institutional basis. The following observations are drawn from the experience of working within four high profile, high impact, multi-disciplinary, and trans-sectorial digital cultural heritage EU projects; ERA Chair Mnemosyne, EUreka3D, EUreka3D-XR, and HERITALISE, and is an attempt to reconcile the diverse definitions of core terms used within digital cultural heritage workflows.

2.1 RECONCILING THE LINEAR & CIRCULAR APPROACHES

There are many models describing the Knowledge Economy, but all are based on the principle of the distillation of data into actionable intelligence. This approach is typified by the scientific method and is essentially a linear approach transforming data to information, information to knowledge, and knowledge into wisdom, or ‘actionable intelligence’[3]. The output of the process is not a product *per se* but an endpoint, the conclusion being used to inform and support decision-making, with data being discarded or extracted in the refinement process. This can be seen as a wasteful process, as data is potentially lost. Paradata attempts to document the process of data refinement, allowing the relevance of data, the decisions to discard data, and its transformation to be understood and, if necessary, reviewed or revisited, reducing data loss. However, paradata does not provide data circularity; it only *allows* for it.

By comparison, the Circular Economy model is product-orientated, seeking to eliminate waste through planning the efficient use of raw materials through all points of the product lifecycle, typified by sustainable design, production methods, and recycling practices to minimise pressure on finite materials. This poses a more significant challenge as data is transformed into actionable information and ultimately a product, raising the question of which digital asset we are attempting to conserve: the raw data acquisition of the heritage resource, the processed data of the object, the enriched digital asset, or the final product?

This question is non-trivial and intrinsically connected to the long-term preservation of digital data and what should be considered as ‘valuable’ to the long-term view of exploitation potential. Here, paradata can be used to assist in understanding the priorities for preservation on a short- or long-term return on investment. While in an ideal world everything should be archived and available for exploitation, pragmatically speaking, those archives must be maintained, financed, and accessible - often beyond the lifespan of a project – and it must be accepted that not everything can be kept in perpetuity.

By rethinking our approach to data as a primary raw material rather than the product of digitisation, the two approaches can be better aligned. The end product of a digitisation – for example, an interactive extended reality exhibit, may be ground-breaking in terms of implementation or engagement - will have a shelf life as technology progresses, consumer digital literacy (and expectations) increases, and the applicability fulfils the needs of the digitisation use case change ultimately becoming redundant, whereas the data used to create the product is likely to still retain value beyond the product itself and available for re-use.

Through the paradata record, both an estimation of the Quality of the digital documentation process and its results can be established, and the motivation/needs of the final output assessed for digital preservation strategy planning and archiving priorities. Moreover, as paradata records the interconnections between and rationale for selection/inclusion of data during the creation of the product, it can assist in identifying those components that are more viable than others for remastering/reprocessing, potentially extending the shelf life of the product. Critically, paradata and metadata drive the Complexity and Quality assessment of digital documentation proposed within the EU VIGIE Study 2020/654 and are seen as a route by which a certification of Quality can be established for digital cultural heritage assets.[4]

Acknowledging this has profound implications for cultural heritage multidisciplinary professionals; data must be stored, maintained and monitored, the principles of FAIR data[5] upheld and have an overall positive net effect contributing to the goals of the UN 2030 Agenda for Sustainable Development[6] and EU aspirations for research and innovation driving transformative change expressed through the European Commission’s recommendation on a common European dataspace for cultural heritage[7].

2.2 USE, REUSE, OR REPURPOSE?

Arguably, the misalignment of the linear and circular approaches has led to the misinterpretation of the phrase “use and reuse” within the *zeitgeist* of digital cultural heritage, with reuse being used synonymously with repurposing or recycling. The Oxford English Dictionary defines ‘reuse’ as “*to use something again or more than once*”; this is different from ‘repurposing’,

which is “*to adapt for use in a different purpose*”.

This small but important distinction implies that digital assets created for one purpose can segue into another. For example, the EC recommendation states, “*Advanced digitisation of cultural heritage assets and the reuse of such content can generate new jobs not only in the cultural heritage sector but also in other cultural and creative sectors, including, for instance, the video game and film industries.*” (page 1 point 4). This is not the reality. ‘reuse’ has a specific term within research, and the subject is explored in depth in van de Sant et al. The Definition of Reuse[8], argues that any use of data beyond that for which it was originally intended is re-use. This opinion aligns with the circular economic model of reuse defined in the EU Waste Framework Directive[9] Article 3 point 13, defining reuse as “*any operation by which products or components ... are used again for the same purpose for which they were conceived.*”. While it is acknowledged that this definition refers to physical rather than digital matter, the point is still valid. The data created from a digitisation effort is undertaken with a clear intent to address a need specified by the stakeholders.

While this may seem pedantic, it has ramifications for cultural heritage professionals involved in digitisation if there is an expectation that the output of a digitisation effort is ‘ready for use’ in another sector with different objectives. This needs to be emphasised to stakeholders at the inception of the digitisation, and, if a requirement, it must have the appropriate level of resources and planning allocated to fulfil the need, like any other requirement of the stakeholder/purpose of digitisation.

Indeed, it appears *prima facie* that the Common European Dataspace for Cultural Heritage is the only infrastructure of the 17 dataspace where ‘content’ provision rather than data-sharing with external sectors (explicitly creative, tourism, and education), with the implication of direct exploitation of said content. While this may not be the case, the potential for misunderstanding of the use of data from a digitisation effort, its subsequent reuse for its intended purpose, or its repurposing beyond its context, is high. Of particular concern is the potential for the context of the digitisation, and the heritage resource it represents, to be lost, altered, or misappropriated unintentionally or otherwise through reuse.

2.3 STAKEHOLDER, USER, OR RE-USER?

In the previous two sections, we have referenced three terms for actors in the digitisation processes: stakeholders, users, and re-users. A simple definition based on the previous discussion is: 1) Anyone who engages with datasets created by the digitisation effort, *as intended*, is a user. 2) Anyone using that data for another purpose is, by definition, a (re)user. 3) By implication, the stakeholder is the actor who identifies and defines the need for the digitisation to be undertaken.

Mapping this back to the circular model, the role of inception and design falls under the purview of the stakeholder (as the vision holder), the role of the consumer is taken by the user (the intended audience), and those who will reuse the data fulfil the role of the recycler (secondary use). These assignments lack one key role, the actor who undertakes the digitisation of the cultural heritage resource on behalf of the stakeholder, transforming the data into a cultural heritage asset that can be deployed to the user in fulfilment of the identified needs and for potential repurposed secondary use elsewhere. This fourth actor maps to the circular model roles of production and dissemination, and can be defined as a **Contributor**.

The Stakeholder

There is no single definition of what a ‘stakeholder’ is. The term can range from the broadest definition: “*Individuals or groups of people, institutions or companies that may be significantly affected, positively or negatively, by the success or failure of an intervention.*” [10] In contrast, some use highly granular definitions for stakeholder identification and analysis for risk management[11]. Most definitions unsurprisingly focus on business or commercial activities, not scholarly research. If cultural heritage is a universal right[12], then everyone becomes a stakeholder to be considered in the equation.

Reflecting on these and framed within cultural heritage digitisation, it is possible to identify a stakeholder as an actor with an investment in the cultural heritage resource, which may be prejudiced through its digitisation. This investment may be financial, legal, moral, or ethical. Stakeholders *actively* contribute to the development of the preconditions, requirements, and

needs defining the digitisation use-case specification (*why* the cultural heritage resource is being digitised, *what* the expected outcomes of digitisation will be, and *how* and *for whom* the results will be used).

By considering the prejudicial impact of the digitisation of a cultural heritage resource on potential stakeholders, this working definition allows both FAIR and CARE[13] data principles to be considered, both identifying and engaging with the stakeholder(s) before any digitisation takes place.

A further distinction can be made between internal and external stakeholders: Internal stakeholders refer to those who identify directly as heritage professionals or are part of a project consortium and actively contribute to the project or digitisation process. External stakeholders are those whose primary activity lies in other sectors but whose actions significantly impact cultural heritage; they do not actively contribute to the digitisation process but may affect or use the results of the project. This distinction is relevant as it highlights that cultural heritage values and impacts extend beyond traditional heritage fields. Stakeholders may include actors such as:

- The owner of the cultural heritage resource (the legal owner, individual or organisation)
- Governmental or State departments responsible for the cultural heritage resource (Ministry for Culture, Department of Antiquities, Superintendente, etc.)
- The stewards of the cultural heritage resource (cultural heritage resource held in trust, e.g., items in a museum collection on loan or held on behalf of the nation)
- The traditional owners/custodians of the cultural heritage resource
- The community surrounding the cultural heritage resource (in the case of a site or monument, e.g., land owners, monastic communities, inhabitants)
- Funders of the digitisation effort

The Contributor

The role of the contributor within the circular data model is taken by the actor tasked to fulfil the identified needs within the specification provided by the stakeholder. By this, we mean the process of creating a cultural heritage asset through digitising the analogue resource. This includes data acquisition, data processing, data

interpretation, data enrichment, and data presentation.

The contributor is responsible for ensuring that the data quality conforms to the expectations of the stakeholder and complies with the agreed formats, metadata, paradata, and licensing required to fulfil the project's FAIR, CARE, or other identified prerequisites before release. As such, this includes managers and administrators who ensure adherence to the agreed specifications and timescales and resource management within a digitisation project. Examples of contributors include:

- Project planners and facilitators
- Digital acquisition team members
- Researchers
- 2D/3D Modellers and post-production designers
- Specialists required to realise the project specification (e.g., Conservators, Archaeologists, Architects, Material Scientists, Civil Engineers, Chemical Engineers, Traditional Knowledge Holders, etc.)

The User

'User' is a generic term, as anyone who makes use of the data produced by the digitisation effort is, by definition, a user. As noted in [1], there is a need to distinguish between user 'types' if a digitisation is to achieve its goals – in short, there must be an audience to whom the results will be addressed and an identified need that the digitisation fulfils for that audience. As the stakeholder role defines the "Why is" and the "Who for" definition of the digitisation effort, this should provide a more focused identification of the user actor.

The boundary between data and product becomes less clear when considering the role of the user. The digital asset may be deployed as a product (e.g., an educational game, museum interactive, etc.), data sets that will be consolidated into other works (e.g., as a component part or asset purposely designed for specific reuse), or a combination of both (e.g., as a focal object for exploring a Memory Twin, being both representational and providing access to underpinning data).

As noted previously, the role of the user can be mapped back to the circular model as a consumer. In other words, the user is the primary

beneficiary of the digitisation output as defined by the stakeholders. Examples of users include:

- Researchers/Scholars
- Policymakers
- Promoters (i.e., the cultural heritage resource was digitised to promote engagement with cultural heritage and/or its wider context, such as tourism)
- Educators (i.e., the cultural heritage resource was digitised for educational use)
- Students (Learners of all types, formal, informal, or casual, as specified)

This does not preclude multiple beneficiaries from a digitisation but rather, by identifying need, helps to distinguish the critical aspects the digitisation must address and be balanced against practical constraints of time, finance, and required quality to meet those needs.

By placing the emphasis on the intent of the digitisation, the process of dissecting the thorny phrase "multidisciplinary user community". If the intended outcome is to support an identified need within the cultural heritage community, the specific group can be identified. The history of cultural heritage is littered with projects (both analogue and digital) where, with good intentions, they assumed that their work would be useful to others based on the "*If you build it, they will come*" fallacy.

If we stop viewing the multidisciplinary user community as something we are in the service of and consider it to be a multidisciplinary team of which we are just one part, we are better placed to identify opportunities where digitisation may support another group and explore if and how digitisation may support a need rather than creating one. Moreover, this change in perspective provides the opportunity to evaluate if the identified user should (or, more likely, to what extent) be involved in defining the needs and shaping the solution as a stakeholder or contributor in their own right.

This is particularly relevant where a holistic approach to the digitisation of cultural heritage is being considered. Holism attempts to integrate all relevant components and their relationships, enabling better identification and interpretation of knowledge gaps, interconnections, and interdependencies. Knowing when, where, and how to stop the digitisation process is key to delivering meaningful and efficient results to fulfil the

user needs, reducing the addition of new features/content to a project, leading to delays, increased costs, and a more complex or unfocused final output.

Those for whom the digitisation, data, and outputs may have benefit outside the intended scope defined by the intention of the stakeholder are considered secondary users and therefore reuse the data.

The Reuser (secondary users)

Reusers are the most difficult of the actors to quantify, as they fall outside of the intent of the digitisation process. Their motivation for engaging with the data from a digitisation effort and how they may repurpose it is *de facto* unexpected and unknown. The common statement that the digitisation of a cultural heritage resource is to “*preserve the asset for future generations*” is a prime example of the reuse argument, but it is impossible to predict how future generations may engage with the digital asset.

This, however, does not mean that the Reuser should be dismissed from the considerations of the project. Meaningful and sustainable reuse of data can occur, and even be encouraged, if the Reuser is provided with mechanisms that facilitate reuse. Reusers must, for example, know how (and if) the data may be reused through IPR and licensing agreements, understanding why and how the dataset was created, and, of course, provision must be made to allow data to be accessible and interoperable through standardisation of data formats.

This additional information must accompany the asset as part of the certified metadata paradata record if the dataset is to be understood, contextualised, and available for impactful reuse. Such information is vital for the scientific and research community if future (re)users can contribute to the digital asset through their own research, by citation, data linking and thereby enhancing the extant corpus, improving the holistic documentation and capitalising on existing work.

The key to providing reusability of datasets is the preservation and archiving strategy for the digitisation. The importance of this cannot be overemphasised if the reuse of cultural heritage data is to be realised. The opening section of this paper considered data as a primary raw material to be protected and conserved. Regardless

of how that data may be realised as a product to fulfil the primary user needs, without a long-term plan for preservation of data, sustainable reuse is impossible.

The view that long-term digital preservation of data is something that occurs at the end of a project (if at all) is in direct conflict with the circular model. Rather, by assigning responsibility for defining at which levels adherence to FAIR data principles is given to the stakeholders, sustainable data management is built into the entire workflow, enabling datasets to continue to be available for future (re)use.

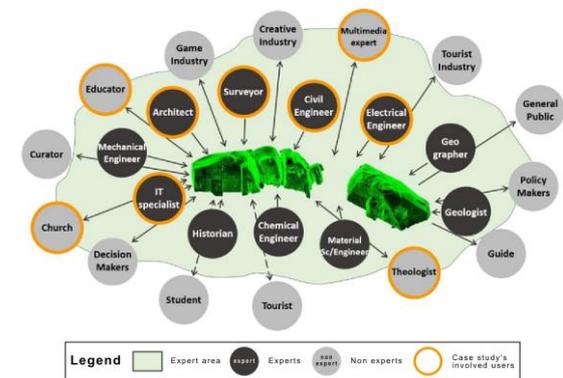


Figure 4: Identified Multidisciplinary Community for St Neophytos' Enkleistra, Cyprus

Multiple Role Actors

It is recognised that a single actor may well undertake multiple roles within a digitisation effort, especially on smaller-scale projects. For example, a community wishing to commission a digitisation to record their community memory would take on the role of Stakeholder as the ‘owner’ of the heritage resource and User as the digitisation is being undertaken to serve the community. Depending on what is to be digitised and how that digitisation will occur, they may also take on the role of contributor. Similarly, through assigning actors roles within the digitisation project, it may be discovered that their participation may be advantageous or required in another role (see the discussion on users and engagement previously).

Only those actors from the Reuse category cannot participate in multiple roles, as their motivations are unknown. If the anticipated reuse needs go beyond the fundamental data certified within the cultural heritage asset, then the actor's role changes from Reuser to User, albeit a *potential* user. This dichotomy was partially addressed within the Mnemosyne Project, making

a distinction between users and experts involved in a digitisation assigning the roles of ‘contributor’ and ‘user’ or ‘interested party’ (see **Figure 4**).

If the project specification states that the cultural heritage asset will be available for reuse by the video game industry, then the video game industry becomes the *de facto* new user, for which part of the project budget must be invested. The Complexity[1] of the project will increase as a result - the needs of the video game industry must be understood, the asset (or derivative) prepared for the new use (a case of redeployment) and in line with any preconditions established by the stakeholders. If this does not occur, time and effort will be wasted in either preparing or converting data on the assumption that the data is fit for the purpose claimed within the digitisation project specification.

3. REFINEMENT & NEXT STEPS

In the digitisation process, the relationship between the roles of Stakeholder, Contributor, and User is a complex interplay of economic and sociocultural interests that shape the planning phase, define the final outputs, and set the boundaries of what is achievable. This is not a straightforward task; as each digitisation effort is unique, it follows that the process will require different (if similar) skills from the multidisciplinary group assembled.

This is not simply just putting a job title to an actor but understanding what it is that actor brings to the role and the process as a whole, helping to both clarify expectations across the diverse actors involved in the digitisation effort and to assist in the identification of gaps (and opportunities) that are available, or missing, from the undertaking. For contributors in particular, this identifies the skills considered necessary to undertake the digitisation to fulfil the needs of both the stakeholder and user.

As seen in **Figure 4**, the categorisation of user/expert and contributor/user defines the broad scope of the digitisation needs, but lacks a degree of specificity that may be beneficial to the undertaking. For example, the expert contributor ‘Surveyor’ covers a myriad of definitions and associated skill sets depending on the individual community terms of reference (civil, mechanical, and electrical engineers, cartographers, draughtsmen, archaeologists, architects, environmental protection professionals, etc.).

To help refine and clarify our common understanding, we can reference the European Skills, Competences, Qualifications and Occupations (ESCO) [15]. The ESCO is a comprehensive taxonomy of occupations cross-linked to expected skillsets and qualifications relevant to the EU labour market and education and training strategy.

By using this refinement, we can better match the needs/skills of digitisation and identify gaps/duplication of skill sets. As an EU initiative, the ESCO has advantages over the more widely known ISCO-08 profession taxonomy [16]: it is connected to skills and qualifications, it considers both vocational and academic skills, and it is translated into 32 languages with an accompanying thesaurus of synonymous job titles. Further, ESCO is dynamic, better reflecting the changing needs of the community, and allowing the different sectors to assess the classifications provided from both a practical and theoretical viewpoint (see Creative FLIP’s report on improving the ESCO for the Cultural and Creative Sectors [17]).

Through focusing on shared skill competence rather than occupation designation (i.e., the actor’s role within the digitisation), the described method emphasises a human-centred approach that crosses disciplines and sectors, fostering the principles of holistic documentation by establishing links between diverse data sources.

This approach is not perfect, as it necessarily geared towards occupations, and how we integrate less well defined non-occupational actors (students, tourists, communities, etc.) into the wider cultural heritage community is a subject of ongoing and proposed research.

4. CONCLUSION

This paper has examined some of the common terms used within digital cultural heritage projects, for which there is a tacit understanding but which anecdotally cause misunderstandings or blockages when developing proposals, planning projects, and establishing common frameworks within the diverse multidisciplinary community of cultural heritage practice.

Through exploring these terms using a role-based approach, we have shown how the digitisation process, traditionally oriented towards the knowledge economy, can be better aligned with the circular economy model. Using the actor role approach, we can start to see more

clearly the importance and value of the data we collect as a long-term investment rather than short-term product-oriented projects through data circularity (whether that be through repurposing, reuse of data, or recycling of components based on created data) while still maintaining integrity and intellectual transparency through good data stewardship.

In turn, clarity of role responsibilities opens up the possibility for more cooperative and inclusive participation by focusing on the fundamental questions of why we digitise cultural heritage, what needs to be digitised, and who we digitise for, allowing earlier identification of critical tasks such as long-term preservation, resource allocation, and more targeted results.

This is by no means a comprehensive document, and further collaborative research will be needed to establish a consensus on common definitions of roles, responsibilities, and meanings within the community at large.

As the multidisciplinary and trans-sectorial importance of digital cultural heritage grows, it will become more necessary to harmonise and coordinate our efforts. This should apply not only to establishing good working practices, protocols for digital archiving and preservation, standards for data acquisition formats, digital documentation and establishing internationally recognised principles for ethical and sustainable use of the cultural heritage assets we create, but also to how we conduct, plan, and manage our collaborative digitisation work.

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